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21.12.2005

PA 1389917



# THE UNITED STATES OF AMERICA

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**UNITED STATES DEPARTMENT OF COMMERCE**

**United States Patent and Trademark Office**

**November 16, 2005**

**THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM  
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OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT  
APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A  
FILING DATE UNDER 35 USC 111.**

**APPLICATION NUMBER: 60/571,828**

**FILING DATE: May 17, 2004**

**THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY  
APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS  
CONVENTION, IS US60/571,828**

**By Authority of the  
Under Secretary of Commerce for Intellectual Property  
and Director of the United States Patent and Trademark Office**



**L. EDELEN  
Certifying Officer**

16523 U.S. PTO

Docket No. CCL\_251

22264 U.S. PTO  
60/571828



COVER SHEET

HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS

Application Type: **Provisional Patent Application**

Sir:

Transmitted herewith for filing is the "provisional" patent application of **Robert S. Bosko**, 29890 Bulverde Lane #14, Bulverde, Texas 78163 who is a resident of the Canada, for Solenoid, Normally Closed Electric to Normally Open Fluid/Air.

Please find enclosed:

- ☒ 10 pages of the provisional patent application;
- ☒ Signed Declaration & Verified Statement of Small Entity Status (if applicable);
- ☒ \_\_\_\_\_ sheets of informal sketches/drawings;
- ☒ 5 Sheets of photographs (describe any other documents included - do not mail prototypes to the USPTO)
- ☒ \$ 80 USPTO filing fee (made payable to the "Commissioner of Patents")

Respectfully Submitted,

Robert S. Bosko

Robert S. Bosko  
29890 Bulverde Lane #14  
Bulverde, Texas 78163  
210-875-9085

Date: 5-17-04

Docket No. CCL\_251

**CERTIFICATE OF MAILING**

In The United States Patent & Trademark Office

In re Application of: **Robert S. Bosko**

Filed: **Provisional Patent Application**

For: **SOLENOID, NORMALLY CLOSED ELECTRIC TO NORMALLY OPEN  
FLUID/AIR**

Express Mail Serial No.: ER 446 869 598 US

**Mailed To:**

Box Provisional Patent Application

Commissioner of Patents

Washington, D.C. 20231

Date of Deposit: 5-17-04

I hereby certify that the attached United States provisional patent application, drawings and/or sketches and/or pictures, transmittal letter and payment in the amount of \$ 80.00 are being deposited with the United States Postal Service under Express Mail service on the date indicated above and is addressed to:

**Box Provisional Patent Application**

**Commissioner of Patents**

**Washington, D.C. 20231**

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Date: 5/17/04

Monday, May 17, 2004 - 00:48:33

Docket No. CCL\_251

16523 U.S. PTO

## **PROVISIONAL PATENT APPLICATION**

### **SPECIFICATION**

**TO ALL WHOM IT MAY CONCERN:**

**BE IT KNOWN THAT I, Robert S. Bosko, a citizen of Canada, have invented a new and useful method and apparatus for converting a solenoid actuated, normally closed electric valve to a normally open, fluid/air actuated valve of which the following is a specification:**

## **SOLENOID, NORMALLY CLOSED ELECTRIC TO NORMALLY OPEN FLUID/AIR**

### **BACKGROUND OF THE INVENTION**

#### **Field of the Invention**

The present invention relates generally to normally closed to electrically open valves and more specifically it relates to converting an electrical solenoid, normally closed valve to a normally open valve that uses fluid/air for providing a simple inexpensive solution to the problem of normally closed solenoid valves that must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control.

#### **Description of the Prior Art**

It can be appreciated that normally closed to electrically actuated open valves have been in use for years. Typically, normally closed to electrically actuated open valves are comprised of solenoid valves that use electricity to operate the function of the valve. The most common example is a two way normally closed solenoid valve that is opened (actuated) by energizing a coil creating a magnetic field that pulls up a plunger allowing flow through the valve from the inlet to the outlet port. Many types of solenoid valves are switched from the closed position to the open position by applying electrical energy to the coil.

The main problem with conventional normally closed to electrically actuated open valves is that electrical energy must be applied to keep the valve open. Another problem with conventional normally closed to electrically actuated open valves is systems that need to be on for long periods of time must have the coil energized to keep liquid or air flowing through the valve. Another problem with conventional normally closed to electrically actuated open valves is normally closed valves need to be energized to stay open thus creating problems for systems that need to be open for long periods of time. This is undesirable in many system designs. Few solutions are available to provide a high volume valve that stays in the open position, providing flow and which valve is only shut down periodically for certain scheduled events. Manual ball valves are often the only reliable alternative to such a problem.

While these devices may be suitable for the particular purpose to which they address, they are not as suitable for providing a simple inexpensive solution to the problem of normally closed solenoid valves that must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control. The main problem with conventional normally closed to electrically opened valves is that electrical energy must be applied to keep the valve open. Another problem is systems that need to be on for long periods of time must have the solenoid coil energized to keep liquid or air flowing through the valve. Also, another problem is normally closed valves need to be energized to stay open thus creating problems for systems that need to be open for long periods of time. This is undesirable in many system designs. Few solutions are available to provide a high volume valve that stays in the open position, providing flow, and is only shut down periodically for certain scheduled events. Manual ball valves are often the only reliable alternative to such a problem.

In these respects, the converted solenoid actuated, normally closed electric to event driven open, now changed to a normally open, event driven closed valve utilizing fluid/air for actuation according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in so doing provides an apparatus primarily developed for the purpose of providing a simple inexpensive solution to the problem of normally closed solenoid valves that must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control.

## SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of normally closed to electrically actuated open valves now present in the prior art, the present invention provides a new method and apparatus for converting a solenoid actuated, normally closed electric valve to a normally open, fluid/air actuated closed valve design wherein the same can be utilized for providing a simple inexpensive solution to the problem of normally closed solenoid valves that must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control.

The general purpose of the present invention, which will be described subsequently in greater detail, is to provide an apparatus and a method to convert a new solenoid, normally closed electric valve to a normally open, fluid/air actuated valve that has many of the advantages of the normally closed to electrically actuated open valve mentioned heretofore and many novel features that result in a new normally opened to a fluid/air actuated closed valve which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art normal closed to normal open, either alone or in any combination thereof.

To attain this, the present invention generally comprises a solenoid valve designed to be normally closed when not energized and open when energized with an inlet and an outlet port modified with a thin rubber disk and the coil stem and plunger components from the valve to be converted. The preferred embodiment incorporates a pilot operated diaphragm solenoid valve manufactured by Orbit Irrigation Products, Inc., which is a normally closed solenoid valve, pilot operated diaphragm type, with a nylon body and a santoprene diaphragm.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the invention that will be described hereinafter.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of the description and should not be regarded as limiting.

A primary object of the present invention is to provide a method and apparatus for converting a solenoid actuated, normally closed electric valve to a normally open fluid/air actuated closed valve that will overcome the shortcomings of the prior art devices.

An object of the present invention is to provide a method and adding an apparatus



to said valve that will providing a simple, inexpensive solution to the problem of normally closed solenoid valves which must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control.

Another object is to provide a method that changes a solenoid, normally closed electric valve to a normally open fluid/air actuated valve that changes a normally closed electrically operated solenoid valve to a normally open solenoid valve that is non electrical.

Another object is to add an apparatus that converts a solenoid actuated, normally closed electric valve to a normally open fluid/air actuated valve that now becomes a pilot operated, solenoid, normally open valve by modifying the dynamics of the valve and operating the valve with a liquid or air connection, in place of the electrical connection that was an integral part of solenoids design.

Another object is to convert by means of a method and apparatus, a solenoid, normally closed electric valve to a normally open fluid/air valve that completely reverses the design function of an existing solenoid valve used in irrigation and must be energized to open to a valve that is opened by the presence of slight flow and pressure and is forced closed with a liquid or air connection applied to plunger pilot control, thus closing the valve a different way to provide a different function and greatly simplify and reduce of cost of automatically closing this converted valve.

Another object is to convert a solenoid actuated, normally closed electric valve to normally open, fluid/air actuated valve that Free flows rather than blocks flow.

Another object is to provide a solenoid, normally closed electric to normally open fluid/air that provide a safe way of shutting off a valve in the event of an emergency where explosive vapors are present and electrical valves cannot be used.

Another object is to provide a solenoid, normally closed electric to normally open fluid/air that operates simply without the need for electricity and provides a flow path that could not be achieved by any other means.

Another object is to provide a solenoid, normally closed electric to normally open fluid/air that normally would require a very expensive type of mechanism to a simple sprinkler valve that is very inexpensive, but in its modified state broadens the scope of the present invention.

Other objects and advantages of the present invention will become obvious to the reader and it is intended that these objects and advantages are within the scope of the present invention.

To the accomplishment of the above and related objects, this invention may be embodied in the form illustrated in the accompanying drawings, attention being called to the fact, however, that the drawings are illustrative only, and that changes may be made in

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the specific construction illustrated.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Various other objects, features and attendant advantages of the present invention will become fully appreciated as the same becomes better understood when considered in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the several views, and wherein:

FIG.1 is a photo of an existing Orbit sprinkler Valve. Electrically operated.

FIG.2 is a photo of the same valve cutaway to show present function.

FIG.3 is a photo of the same valve disassembled to point out the area of modification.

FIG.4 is a photo of the removed coil actuator and the placement of a thin rubber disk in its place.

FIG.5 is photo of the coil actuator stem with a small hole drilled in the shaft to provide an air or liquid opening.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now descriptively to the drawings, in which similar reference characters denote similar elements throughout the several views, the attached figures illustrate a solenoid actuated, normally closed electrically being converted to a normally open fluid/air valve, which comprises a solenoid valve designed to be normally closed when not energized and open when energized with an inlet and an outlet port, modified with a thin rubber disk and the coil stem and plunger components from the valve to be converted. The preferred embodiment incorporates a pilot operated diaphragm solenoid valve manufactured by Orbit Irrigation Products, Inc., which is a normally closed solenoid valve pilot operated diaphragm type with a nylon body and a santoprene diaphragm.

Normally Closed solenoid valve pilot operated diaphragm type, nylon body, santoprene diaphragm. The present invention will teach that a Normally Closed solenoid valve can be easily converted to a Normally open solenoid valve and also be converted from electrically operated to fluid or air operated. Many types of valves of normally closed solenoid valves can be transformed into desirable normally open solenoid valves with the techniques and expertise disclosed in the present invention.

Inlet and Outlet ports of the main valve to be converted and the modified coil, stem, and plunger provide an interface for liquid or compressed air actuation. Very few variations accomplish the novel transformation of a valve designed for one purpose to a valve that has a completely different function.

The invention incorporates a technique that completely reverses the purpose of a Normally Closed solenoid valve, to a Normally open solenoid valve. This is accomplished by removing the coil, stem and plunger components and inserting a rubber disk. Then one replaces the coil stem after removing the electrical coil. A small hole is then drilled into the end of the coil stem shaft and liquid tube connector is adapted to the stem. A 3/8" John Guest quick connect tube fitting inserts over the stem shaft. In several of the valve conversions, the plunger was left out of the process. It is now clearly understood that the plunger should remain in the shaft, but the bias spring is omitted. The valve is now a different valve that operates non electrically and stays in the open position rather than the closed position. This was accomplished when the rubber disk was inserted, thus preventing the valve from closing. When the valve needs to be closed, a very small amount of liquid under only 6 to 8 PSI will keep the valve closed. The present invention solves the problems that are created by electrically operated valves held energized during long periods of time. The present invention will greatly benefit systems handling explosive vapors. Petroleum transfer systems can be shut off with a burst of compressed air. These modified valves will be very useful in preventing flood damage by hot water heater blow outs, by simply connecting the blowout tube to the valve shutoff port and in the event of such an emergency the water supply will be shut down.

As to a further discussion of the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no

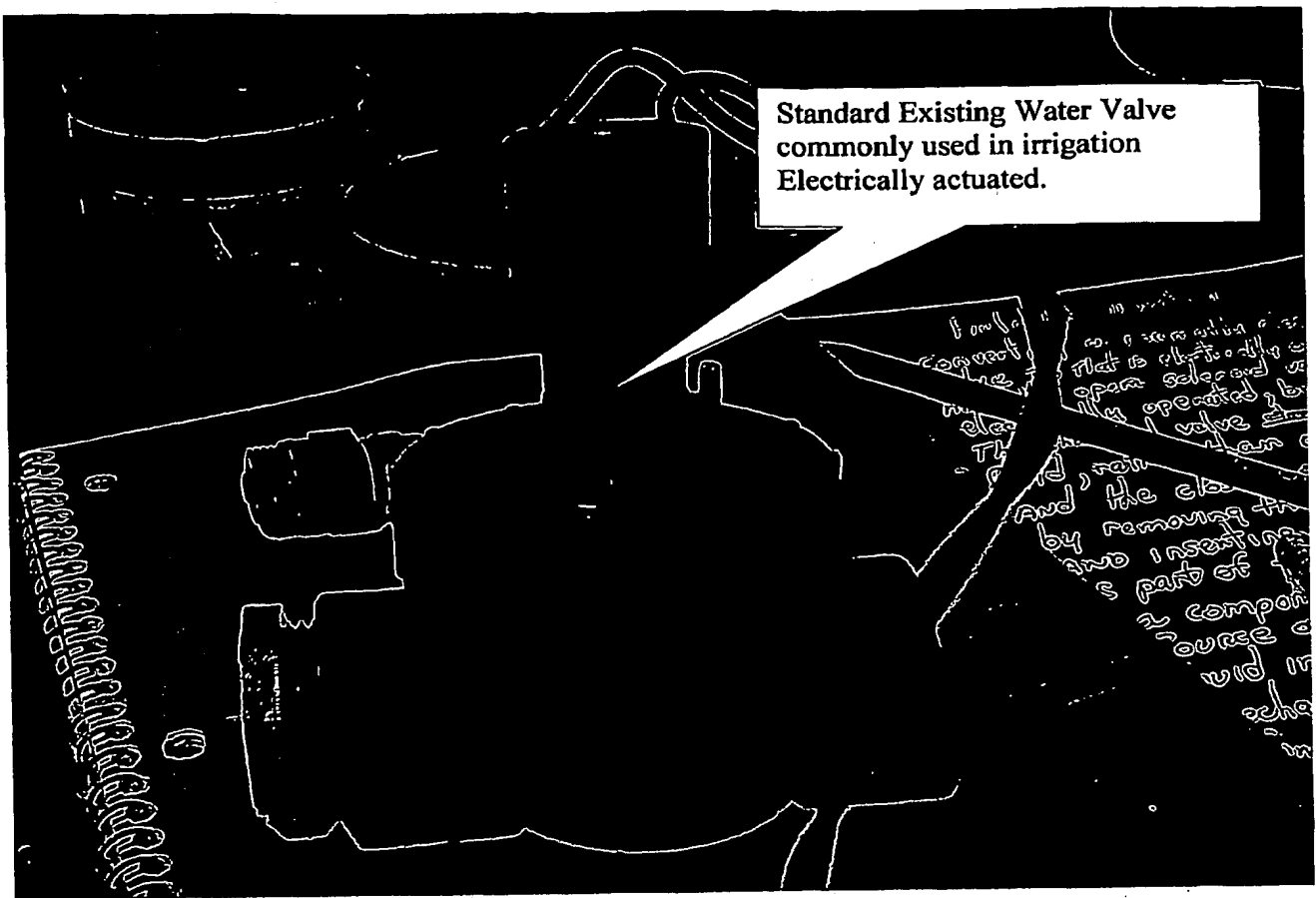
further discussion relating to the manner of usage and operation will be provided.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

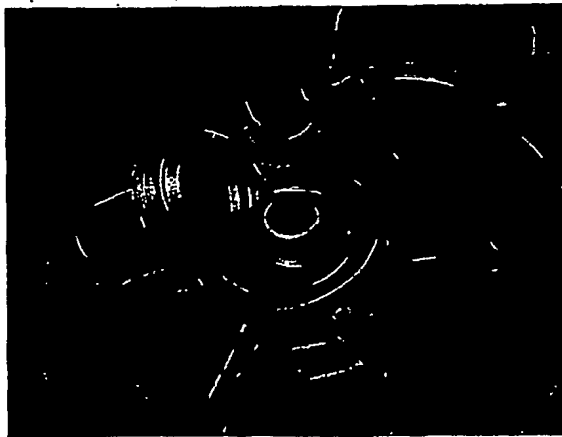
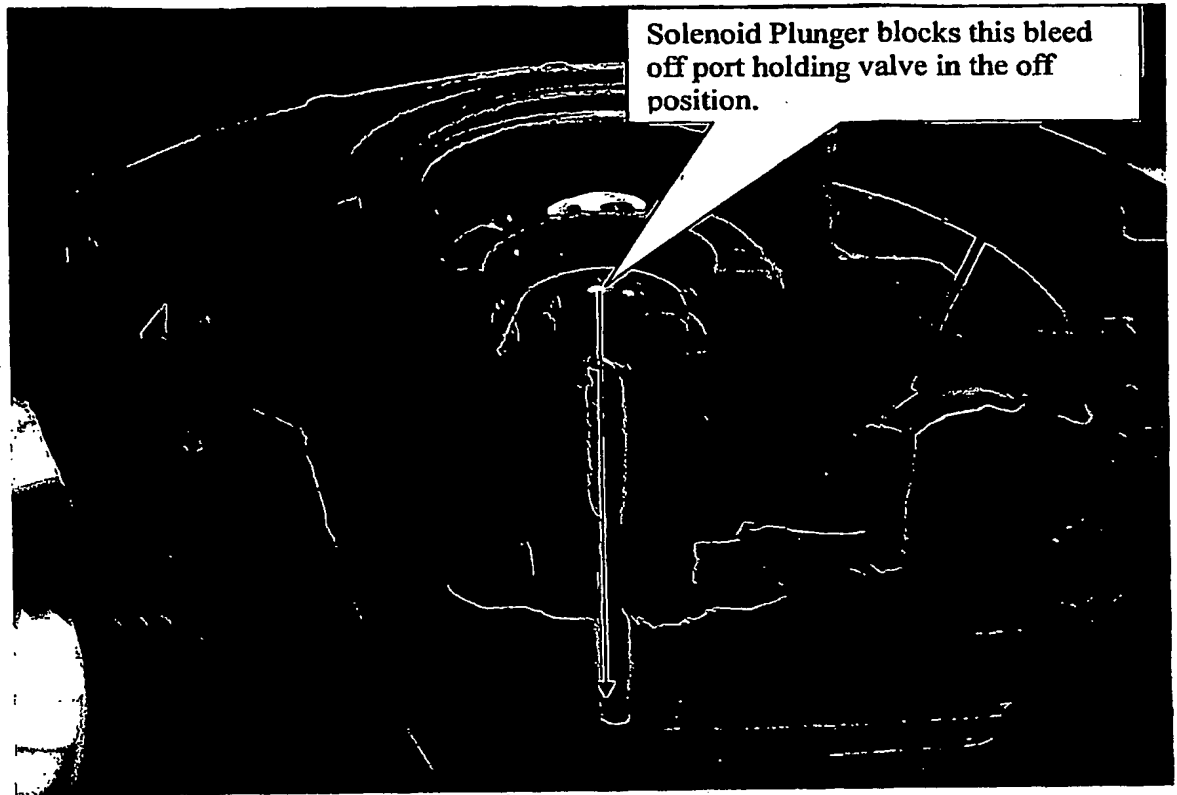
### **ABSTRACT OF THE DISCLOSURE**

A method and an apparatus to alter the original design purpose of a normally closed valve that is electrically driven open valve with a solenoid to a normally open valve that is fluid/air actuated, for providing a simple inexpensive solution to the problem of normally closed solenoid valves that must be electrically actuated to stay in the open position by modifying and converting the normally closed valve into a normally open valve, and changing the electrical control to fluid or compressed air control. The inventive device includes a solenoid valve designed to be normally closed when not energized and open when energized with an inlet and an outlet port, a thin rubber disk and the coil stem and plunger components from the valve to be converted. The preferred embodiment incorporates a pilot operated diaphragm solenoid valve manufactured by Orbit Irrigation Products, Inc., which is a normally closed solenoid valve, pilot operated diaphragm type, with a nylon body and a santoprene diaphragm.



**FIGURE 1**

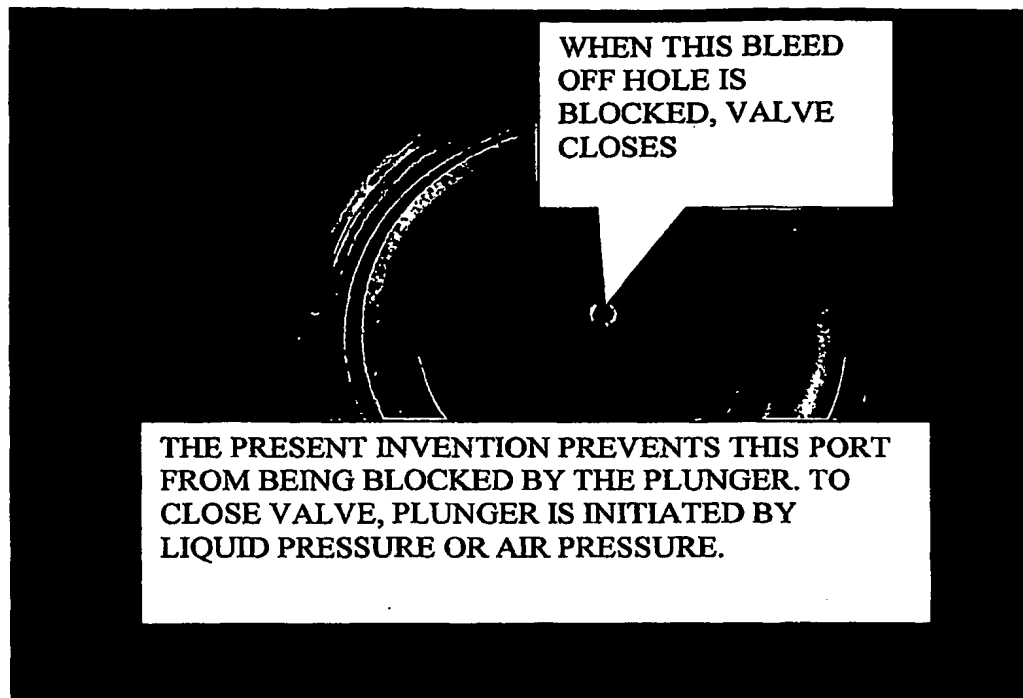
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**FIGURE 2**

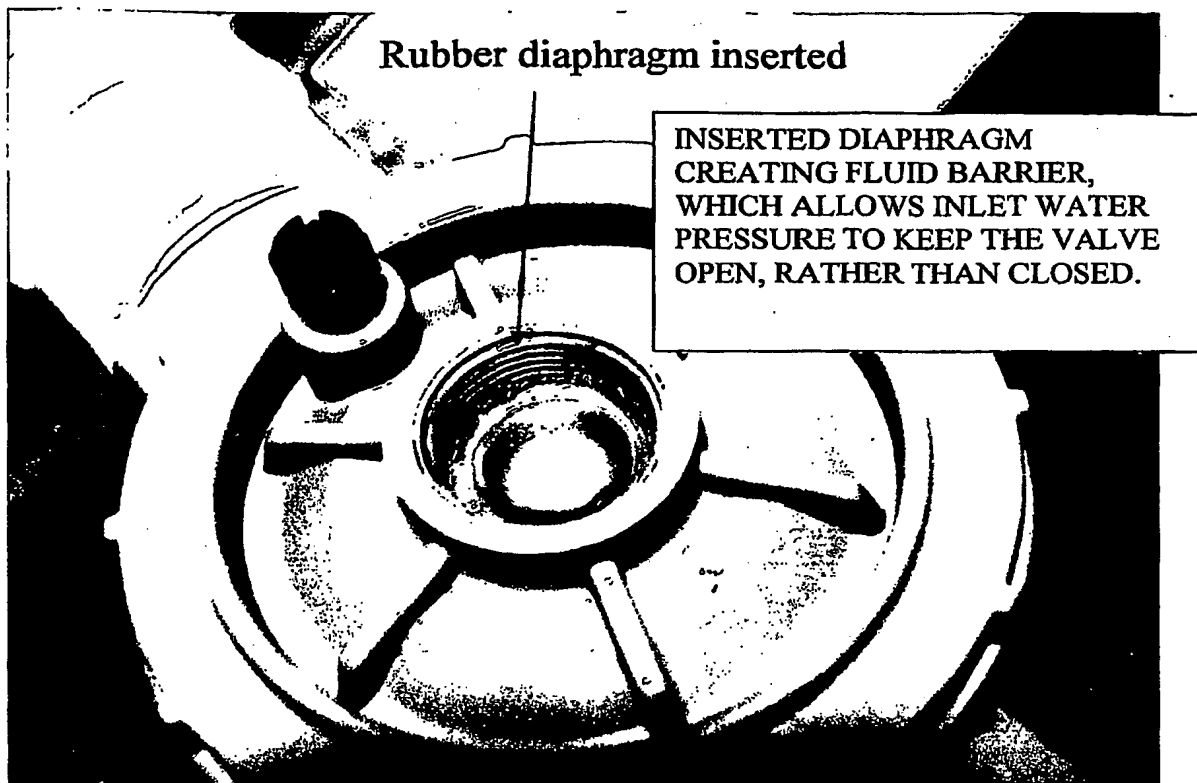
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**FIGURE 3**

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**FIGURE 4**

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Hole drilled allows fluid or gas  
connection to close valve.

THE INSERTED DIAPHRAGM AND THE INTRODUCTION  
OF THE ACCESS HOLE DRILLED INTO THE STEM IS THE  
PREFERRED TECHNIQUE USED TO MODIFY THE VALVE  
FROM NORMALLY CLOSED TO NORMALLY OPEN

## FIGURE 5

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**DECLARATION**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

**SOLENOID, NORMALLY CLOSED ELECTRIC TO NORMALLY OPEN  
FLUID/AIR**

the specification of which is attached hereto.

I further state that I do not know and do not believe that the above-named invention has ever been known or used in the United States before my invention thereof, or patented or described in any printed publication in any country before my invention thereof, or more than one year prior to this application, or in public use or on sale in the United States more than one year prior to this application; that the invention has not been patented or made the subject of any inventor's certificate in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than six (6) months prior to this application; and that no application for patent or inventor's certificate on the invention has been filed by me or my representatives or assigns in any country foreign to the United States, except as identified below.

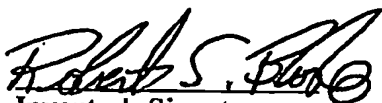
I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims (if included), as amended by any amendment if applicable.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

**Robert S. Bosko**  
Full Name of Inventor

Monday, May 17, 2004 - 00:48:33



Inventor's Signature

Date: 5-17-04

**29890 Bulverde Lane #14, Bulverde, Texas 78163**

Residence

**Canada**

Citizenship

Docket No. CCL\_251

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY  
STATUS (37 CFR 1.9(f) and 1.27(b)) - INDEPENDENT INVENTOR**

Applicant or Patentee: **Robert S. Bosko**

For: **SOLENOID, NORMALLY CLOSED ELECTRIC TO  
NORMALLY OPEN FLUID/AIR**

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled as above and described in:

☒ the specification filed herewith.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☒ no such person, concern, or organization

☐ persons, concerns or organizations listed below\*

\*NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

FULL NAME: NOT APPLICABLE  
ADDRESS: NOT APPLICABLE

☐ INDIVIDUAL

☐ SMALL BUSINESS CONCERN

☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which

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status as a small entity is no longer appropriate (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

**Robert S. Bosko**

Full Name of Inventor

*Robert S. Bosko*  
Inventor's Signature

Date: 5-17-04